

FORAGE SUITABILITY GROUP CLAYEY SUBSOIL

FSG No.: G063AY210SD

Major Land Resource Area: 63A - Northern Rolling Pierre Shale Plains

Physiographic Features

Soils in this group typically occur on upland positions such as backslopes, footslopes, and toeslopes. A few occur on flood plains.

	<u>Minimum</u>	<u>Maximum</u>
Elevation (feet):	1300	2950
Slope (percent):	0	15
Flooding:		
Frequency:	None	Occasional
Duration:	None	Brief
Ponding:		
Depth (inches):		
Frequency:	None	None
Duration:	None	None
Runoff Class:	Medium	Very high

Climatic Features

This group occurs in a mid-continental climate characterized by wide seasonal temperature and precipitation fluctuations and extremes.

Annual precipitation varies widely from year to year in MLRA 63A. Average annual precipitation for all climate stations listed below is about 17 inches. About 77 percent of that occurs during the months of April through September. On average, there are about 25 days with greater than .1 inches of precipitation during that same time period. Precipitation is less than needed for optimum forage production and is the single largest factor limiting production from this group on non-irrigated lands.

Average annual snowfall ranges from 24 inches at Midland to 48 inches at Milesville. Snow cover at depths greater than 1 inch range from 27 days at Midland to 82 days at Timber Lake.

Average July temperatures across the MLRA are about 75°F and average January temperatures are about 17°F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -37 at Kennebec and a high of 114 at both Kennebec and Midland. The MLRA lies in USDA Plant Hardiness Zones 4a, 4b and 5a.

The climate data listed in the tables below represent high and low ranges and averages for the climate stations and dates listed. For additional climate data, access the National Water and Climate Center at <http://www.wcc.nrcs.usda.gov>.

	From	To
Freeze-free period (28 deg) (days): (9 years in 10 at least)	129	162
Last Killing Freeze in Spring (28 deg): (1 year in 10 later than)	May 20	May 04
Last Frost in Spring (32 deg): (1 year in 10 later than)	May 31	May 16
First Frost in Fall (32 deg): (1 year in 10 earlier than)	Sep 09	Sep 24

	From Sep 17	To Oct 01
First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than)		
Length of Growing Season (32 deg) (days): (9 years in 10 at least)	110	139
Growing Degree Days (40 deg):	4442	5149
Growing Degree Days (50 deg):	2517	3083
Annual Minimum Temperature:	-30	-15
Mean annual precipitation (inches):	16	18

Monthly precipitation (inches) and temperature (F)

2 years in 10:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip. Less Than	0.10	0.09	0.31	0.82	1.44	1.55	0.90	0.64	0.41	0.30	0.08	0.16
Precip. More Than	0.60	0.79	2.37	3.46	3.82	4.55	3.58	2.46	1.98	2.06	1.07	0.91
Monthly Average:	0.30	0.42	1.20	1.99	2.86	3.06	2.23	1.80	1.31	1.12	0.48	0.45
Temp. Min.	3.9	9.7	20.0	32.9	44.0	53.9	59.6	57.3	46.4	35.5	20.8	7.9
Temp. Max.	32.8	38.6	48.3	63.1	74.1	83.8	92.2	90.6	79.3	66.4	48.4	35.9
Temp. Avg.	17.1	22.9	33.0	46.7	58.0	68.0	75.0	73.0	61.7	49.6	33.5	20.5

<u>Climate Station</u>	<u>Location</u>	<u>From</u>	<u>To</u>
SD5691	Mobridge SD	1961	1990
SD8307	Timber Lake SD	1961	1990
SD6170	Oahe Dam SD	1961	1990
SD5506	Midland SD	1961	1990
SD5544	Milesville SD	1961	1990
SD6552	Philip SD	1961	1990
SD5891	Murdo SD	1961	1990
SD4516	Kennebec SD	1961	1990

Soil Interpretations

The clayey subsoil group consists mostly of well drained, moderately deep to very deep, medium to fine textured soils formed from overlying materials weathered from shale. Available water capacity ranges from low to high, and permeability is mostly slow and very slow.

Some of these soils have medium surface textures, but all have clayey subsoils.

Drainage Class:	Moderately well drained	To	Well drained
Permeability Class: (0 - 40 inches)	Slow	To	Very slow
Frost Action Class:	Low	To	Moderate

	<u>Minimum</u>	<u>Maximum</u>
Depth:	20	
Surface Fragments >3" (% Cover):	0	3
Organic Matter (percent): (surface layer)	1.0	5.0
Electrical Conductivity (mmhos/cm): (0 - 24 inches)	0	8
Sodium Absorption Ratio: (0 - 12 inches)	0	13
Soil Reaction (1:1) Water (pH): (0 - 12 inches)	6.1	8.4
Available Water Capacity (inches): (0 - 60 inches)	3	11
Calcium Carbonate Equivalent (0 - 12 inches)	0	23

Adapted Species List

The following forage species are considered adapted to grow on the soils in this group. Additional information concerning plant characteristics of a number of the listed species as well as individual cultivars of many of those species can be accessed at <http://plants.usda.gov/>.

Cool Season Grasses

Altai wildrye	G
Crested wheatgrass	G
Green needlegrass	G
Intermediate wheatgrass	G
Meadow brome grass	F
Newhy hybrid wheatgrass	G
Pubescent wheatgrass	G
Russian wildrye	G
Slender wheatgrass	G
Smooth brome grass	F
Tall wheatgrass	G
Western wheatgrass	G

Warm Season Grasses

Big bluestem	G
Indiangrass	F
Little bluestem	G
Sideoats grama	G
Switchgrass	G

Legumes

Alfalfa	G
Birdsfoot trefoil	F
Canada milkvetch	F
Cicer milkvetch	F
Sweetclover	G
White prairieclover	F

G - Good adaptation for forage production on this group of soils in this MLRA

F - Fair adaptation but will not produce at its highest potential

Production Estimates

Production estimates listed here should only be used for making general management recommendations. Onsite production information should always be used for making detailed planning and management recommendations.

The high forage production estimates listed below are based on dense, vigorous stands of climatically adapted, superior performing cultivars. They are properly fertilized for high yields and pest infestations are kept below economic thresholds. Mechanical harvests are managed to maintain stand life by cutting at appropriate stages of maturity and harvest intervals. If grazed, optimum beginning and ending grazing heights are adhered to. Adequate time is allowed for plant recovery before entering winter dormancy under both uses.

The production estimates listed below represent total annual above ground plant production on an air-dry-matter basis. Estimates of hay and grazing yields can be calculated from these numbers by multiplying them by a harvest efficiency. A 70 percent harvest efficiency is commonly used when converting to hay yields. Pasture harvest efficiency is highly dependent on the grazing management system applied, ranging from 25 to 50 percent.

Forage Crop

Management Intensity

	<u>High</u> (lbs/ac)	<u>Low</u> (lbs/ac)
Alfalfa	6000	2500
Alfalfa/Crested wheatgrass	4900	1700
Alfalfa/Intermediate	4900	2400
Alfalfa/Pubescent wheatgrass	4900	2400
Alfalfa/Smooth brome grass	4900	2400
Crested wheatgrass	4000	1800
Green needlegrass	3000	1300
Intermediate wheatgrass	4300	1600
Smooth brome grass	4300	1600
Western wheatgrass	3000	1300

Forage Growth Curves

Growth curves estimate the seasonal distribution of growth of the various forage crops. They indicate when the forages may be available for grazing or mechanical harvest.

Growth Curve Number: SD0001
Growth Curve Name: Alfalfa
Growth Curve Description: Alfalfa, MLRA's 107, 102B, 63B, 66, 65

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	30	25	20	15	5	0	0	0

Growth Curve Number: SD0004
Growth Curve Name: Cool season grass
Growth Curve Description: Cool season grass, statewide

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	10	40	30	10	5	5	0	0	0

Growth Curve Number: SD0005
Growth Curve Name: Warm season grass
Growth Curve Description: Warm season grass, statewide

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	0	10	40	35	15	0	0	0	0

Growth Curve Number: SD0003
Growth Curve Name: Irrigated Alfalfa
Growth Curve Description: Irrigated Alfalfa, statewide

Percent Production by Month											
<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	25	25	20	15	10	0	0	0

Soil Limitations

The primary limiting factors to these soils are their tight, slowly permeable nature. Because of their slow water intake runoff is increased causing the soils to be droughty. This will be especially apparent on those soils with lower available water holding capacity. On steeper slopes, water erosion is a potential problem during establishment, when renovating stands, and in thin established stands. Livestock trail erosion is a potential problem in established stands.

Management Interpretations

The impact on yields due to the tight, slowly permeable nature and droughtiness of these soils can be reduced by selecting species adapted to those soil conditions when establishing new stands or renovating stands. Including sod forming grass species in stands, especially on steeper slopes will reduce the potential for sheet and rill erosion. Incorporate erosion control practices during the establishment period. Properly locating facilitating practices such as fences, lanes, and water developments can help control livestock movement, reduce trailing perpendicular to steeper slopes, and evenly distribute grazing pressure.

FSG Documentation

Similar FSG's:

FSG ID	FSG Narrative
G063AY800SD	Claypan soils have elevated salinity, sodicity, and/or alkalinity and are less productive.

Inventory Data References

Agriculture Handbook 296-Land Resource Regions and Major Land Resource Areas
Natural Resources Conservation Service (NRCS) National Water and Climate Center data
USDA Plant Hardiness Zone Maps,
National Soil Survey Information System (NASIS) for soil surveys in South Dakota counties in MLRA 63A
South Dakota NRCS South Dakota Technical Guides
NRCS National Range and Pasture Handbook
Various South Dakota Agricultural Research Service, Cooperative Extension Service, and NRCS research trials for plant adaptation and production.

State Correlation

This site has been correlated with the following states: South Dakota

Forage Suitability Group Approval

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